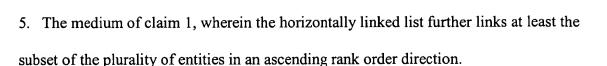I claim:

1. A machine-readable medium having a data structure stored thereon for efficiently

ordering a plurality of entities, each entity having a rank within a plurality of ranks, the

data structure comprising:

5   a horizontally linked list linking at least a subset of the plurality of entities in at least

a descending rank order direction, each entity in the horizontally linked list having a

unique rank as compared to the ranks of other entities in the horizontally linked list; and,

       an array having a plurality of array entries over which the plurality of ranks are

distributed such that each array entry has a corresponding range of ranks, at least one

10   array entry each pointing to an entity of the plurality of entities having a greatest rank

within the corresponding range of ranks for the array entry.

2. The medium of claim 1, the data structure further comprising at least one vertically

linked list, each vertically linked list linking in at least one direction a corresponding

subset of the plurality of entities having an identical rank.

15 3. The medium of claim 2, wherein each vertically linked list links the corresponding

subset of the plurality of entities in a first vertical direction and a second vertical

direction.

4. The medium of claim 1, the data structure further comprising a head pointer pointing

to an entity having a greatest rank of the plurality of ranks of the plurality of entities.

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5. The medium of claim 1, wherein the horizontally linked list further links at least the subset of the plurality of entities in an ascending rank order direction.

6. The medium of claim 1, wherein the plurality of ranks are equally distributed over the plurality of array entries.

5   7. The medium of claim 1, wherein the entity having the greatest rank within the corresponding range of ranks for each of one or more of the at least one array entry is one of a subset of the plurality of entities having the greatest rank within the corresponding range of ranks for the array entry.

8. The medium of claim 1, wherein at least one array entry of the plurality of array
10   entries each points to null, corresponding to no entity within the plurality of entities having a rank within the corresponding range of ranks for the array entry.

9. The medium of claim 1, wherein each entity of the plurality of entities is a thread, the rank of the entity is a priority for the thread, and the array is a priority queue.

10. A method for removing a particular entity from a plurality of entities, each entity
15   having a rank within a plurality of ranks, the method comprising:

in response to determining that the particular entity is present within a vertically linked list linking in at least one direction a corresponding subset of the plurality of entities having an identical rank, the corresponding subset including the particular entity, delinking the particular entity from the vertically linked list;
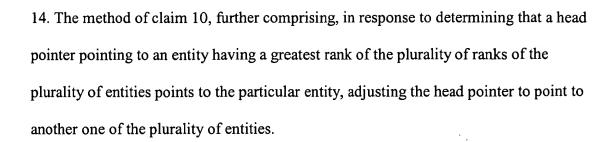
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in response to determining that the particular entity is present within a horizontally

linked list linking at least a subset of the plurality of entities in at least in a descending

rank order direction, the subset including the particular entity, delinking the particular

entity from the horizontally linked list; and,

5   in response to determining that an array entry of a plurality of array entries of an array

over which the plurality of ranks are distributed points to the particular entity, adjusting

the array entry to point to one of null and another one of the plurality of entities.

11. The method of claim 10, wherein the array entry has a corresponding range of ranks,

and adjusting the array entry to point to one of null and another one of the plurality of

10   entities comprises, in response to determining that the particular entity was present within

the vertically linked list, adjusting the array entry to point to a next entity within the

vertically linked list.

12. The method of claim 11, wherein adjusting the array entry to point to one of null and

another one of the plurality of entries further comprises, otherwise, in response to

15   determining that the particular entity was present within the horizontally linked list, and

that the rank of a next entity within the horizontally linked list is within the

corresponding range of ranks for the array entry, adjusting the array entry to point to the

next entity within the horizontally linked list.

13. The method of claim 12, wherein adjusting the array entry to point to one of null and

20   another one of the plurality of entries further comprises, otherwise, adjusting the array

entry to point to null.

14. The method of claim 10, further comprising, in response to determining that a head pointer pointing to an entity having a greatest rank of the plurality of ranks of the plurality of entities points to the particular entity, adjusting the head pointer to point to another one of the plurality of entities.

5   15. The method of claim 14, wherein adjusting the head pointer to point to another one of the plurality of entities comprises, in response to determining that the particular entity was present within the vertically linked list, adjusting the head pointer to point to a next entity with the vertically linked list.

16. The method of claim 15, wherein adjusting the head pointer to point to another one of

10   the plurality of entities comprises, otherwise, in response to determining that the particular entity was present within the horizontally linked list, adjusting the head pointer to point to a next entity within the horizontally linked list.

17. The method of claim 10, wherein each entity of the plurality of entities is a thread, the rank of the entity is a priority for the thread, and the array is a priority queue.

15   18. The method of claim 10, wherein the method is performed by execution of a computer program stored on a machine-readable medium by a processor.

19. A method for adding a new entity having a rank within a plurality of ranks to a plurality of entities also each having a rank within the plurality of ranks, the method comprising:

of a plurality of array entries of an array over which the plurality of ranks are distributed such that each array entry has a corresponding range of ranks, determining the array entry having the corresponding range of ranks in which the rank of the new entity lies;

5   adjusting the array entry having the corresponding range of ranks into which the rank of the new entity lies to point to the new entity in response to determining that the array entry currently points to null;

adjusting the array entry having the corresponding range of ranks into which the rank of the new entity lies to point to the new entity in response to determining that the array

10   entry current points to an entity having a rank less than the rank of the new entity;

linking the new entity into a vertically linked list linking in at least one direction a corresponding subset of the plurality of entities having an identical rank, in response to determining that the rank of the new entity is equal to the rank of any other entity within the plurality of entities; and,

15   otherwise, linking the new entity into a horizontally linked list linking at least a subset of the plurality of entities in at least a descending rank order direction, each entity in the horizontally linked list having a unique rank as compared to the ranks of other entities in the horizontally linked list.

20. The method of claim 19, further comprising adjusting a head pointer pointing to an

20   entity having a greatest rank of the plurality of ranks of the plurality of entities to point to the new entity in response to determining that the rank of the new entity is greater than the rank of the entity of the plurality of entities to which the head pointer currently points.

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21. The method of claim 19, wherein each entity of the plurality of entities is a thread, the rank of the entity is a priority for the thread, and the array is a priority queue.

22. The method of claim 19, wherein the method is performed by execution of a computer program stored on a machine-readable medium by a processor.

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